Demonstration and Implementation of Novel UK 3-D SONAR Technology for Surveying and Mapping of Tank Sludges

PARTNERS

NuVision Engineering (NVE) and Fortis

Savannah River Remediation (SRR)

SONAR demonstration with members of NVE, Fortis, SRR and DOE EM.

Technical Summary

This project is focused on demonstrating the capability of a three-dimensional (3-D) sonar mapping technology to provide an accurate estimate of residual solids in a tank without first removing the tank's liquid contents. This approach may allow effective, efficient, and targeted strategies for bulk waste removal (BWR), such as localized waste retrieval of an identified mound or mass of solids during mixer operations. As envisioned, when the sonar mapping shows negligible solids, BWR can be declared complete and further waste removal activities deemed unnecessary, thereby accelerating the overall tank closure process. If proven to be reliable, implementation of the UK-developed 3-D SONAR technology within DOE EM could likely be considered a High-Impact Technology, as defined in the Secretary of Energy Advisory Board Report on Technology. The 3-D SONAR technology has reached a high level of maturity in the UK and DOE EM is taking advantage of these prior efforts to accelerate deployment for US applications. As a result, the technology will be demonstrated on an actual tank (Tank 7 at Savannah River Site [SRS]) in FY17, which will serve as a test bed to assess its suitability for widespread use across the DOE complex. If successful, this technology will help address a key challenge in the DOE complex, especially at SRS and Hanford, related to effective management of radioactive sludges/tank closure in million gallon tanks.

Path Forward

- Procure and fabricate equipment for deployment at Savannah River Tank 7.
- Conduct field deployment and demonstration at SRS.
- Work with Hanford (DOE Office of River Protection) to develop and implement a plan for field demonstration in a Double Shell Tank (DST).
- Procure / build equipment for Hanford deployment ensuring optimum re-use of equipment from SRS deployment.
- Conduct field deployment and demonstration at Hanford.

Key Accomplishments

- Developed a plan for deployment in Tank 4 and Tank 7 including identifying necessary equipment based on results from 3-D sonar modeling analysis.
- Conducted multiple modeling campaigns to determine ideal deployment methodology based on available risers, interferences and water level, thereby ensuring optimum operations. Created shadow maps to indicate coverage.
- Completed a detailed design of the sonar equipment, controls, interface, deployment mast and over-canning necessary for deployment in Tank 4.

Key Benefits

- Addresses a widely acknowledged high priority need in the DOE complex (i.e. effective management of sludges/accelerated tank closure in million gallon tanks at both SRS and Hanford).
- Integration and close collaboration of the HQ technology program with the Savannah River and Hanford sites respective technology development efforts provides focused resources such that near term deployment of this innovative technology can be realized.
- Leverages UK investment (Government and private) and operational experience to help EM achieve tank closures as cost effectively, safely and quickly as possible through elimination of multiple 'mix, settle, pump, mix' cycles.

For more information on this project or the EM International Program

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